

Application No. 10/763,445
Amendment dated January 25, 2006
Reply to Office Action of October 25, 2005

Docket No.: 66046-0007 (01-rTRN-28)

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A powertrain system, comprising:
a prime mover;
a change-gear transmission including an input, at least two selectable gear ratios, and an output, wherein at least the prime mover selectively applies power to the transmission; and
a power shunt including a first motor-generator and a second motor-generator, that selectively shunts at least a portion of the configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output, wherein the first motor-generator selectively generates a power output from a rotational input, the second motor-generator selectively generates a rotational output from a power input, and wherein the ratio gears are engaged by a clutch and the power shunt is configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output such that the rotational speed of a ratio gear is substantially similar to the rotational speed of an engaging clutch during a gear ratio change.
2. (Cancelled)
3. (Currently Amended) The powertrain system of claim 1-2, wherein the first motor-generator is connected to the input and the second motor-generator is connected to the output.
4. (Currently Amended) The powertrain system of claim 1-2, wherein the first motor-generator is driven by the prime mover.
5. (Currently Amended) The powertrain system of claim 1-2, wherein the first and second motor-generators are electric motor-generators.
6. (Canceled)

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7. (Currently Amended) The powertrain system of claim 1-2, wherein the first motor-generator is a generator and the second motor generator is a motor when driveline torque is positive.
8. (Currently Amended) The powertrain system of claim 1-2, wherein the first motor-generator is a motor and the second motor-generator is a generator when driveline torque is negative.
9. (Currently Amended) The powertrain system of claim 1-2, wherein the power shunt includes electric power generated by one of the first and second motor-generators.
10. (Canceled)
11. (Original) The powertrain system of claim 1, wherein the input is an input shaft and the output is an output shaft.
12. (Original) The powertrain system of claim 1, wherein the power shunt includes an energy storage device.
13. (Original) The powertrain system of claim 12, wherein the energy storage device stores electric power or fluid power.
14. (Original) The powertrain system of claim 1, wherein the ratio gears are engaged by a clutch and the power shunt is configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output such that power transmitted between a selected ratio gear and an engaging clutch significantly decreases or falls to zero.

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15. (Canceled)
16. (Currently Amended) A powertrain system, comprising:
a prime mover;
a change-gear transmission that includes an input, at least two gear ratios and an output;
a first motor-generator connected to the input and a second motor-generator connected to the output,
a first power path between the input and the output of the transmission, the first power path defined by the gear ratios of the transmission; and
a second power path between the input and the output of the transmission, the second power path including a transfer of power from a rotational input to a non-rotational power transfer medium in one of the first motor-generator and the second motor-generator, and a transfer of power from the non-rotational power transfer medium to a rotational output in one of the first motor-generator and the second motor-generator defined by the first and second motor-generators.
17. (Original) The powertrain system of claim 16, wherein first and second motor-generators are configured to route power through the second power path such that the power applied to the input is substantially similar to the power applied to the output during a gear change event.
18. (Original) The powertrain system of claim 16, wherein the first motor-generator is a generator and the second motor-generator is a motor when driveline torque is positive.
19. (Original) The powertrain system of claim 16, wherein the first motor-generator is a motor and the second motor-generator is a generator when driveline torque is negative.
20. (Original) The powertrain system of claim 16, wherein the second power path includes electric power generated by one of the first and second motor-generators.

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21. (Canceled)

22. (Original) The powertrain system of claim 16, wherein the first and second motor-generators are either a motor or a generator.

23. (Original) The powertrain system of claim 16, wherein the input is an input shaft and the output is an output shaft.

24. (Original) The powertrain system of claim 16, wherein the second power path includes an energy storage device.

25. (Original) The powertrain system of claim 24, wherein the energy storage device stores electric power or fluid power.

26. (Currently Amended) The powertrain system of claim 16, wherein the ratio gears are engaged by a clutch and ~~a~~ the power shunt is configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output such that power transmitted between a selected ratio gear and an engaging clutch significantly decreases or falls to zero.

27. (Currently Amended) The powertrain system of claim 16, wherein the ratio gears are engaged by a clutch and ~~a~~ the power shunt is configured to route power through the second power path such that the rotational speed of a ratio gear is substantially similar to the rotational speed of an engaging clutch during a gear ratio change.

28. (Currently Amended) A transmission system, comprising:
a change-gear transmission including an input, at least two gear ratios, and an output; and

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a power shunt including a first motor-generator and a second motor-generator, that selectively shunts at least a portion of the ~~configured to route~~ power applied to the transmission by one of the input and the output to the other one of the input and the output, wherein the first motor-generator selectively generates a power output from a rotational input, the second motor-generator selectively generates a rotational output from a power input, and wherein the ratio gears are engaged by a clutch and the power shunt is configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output such that power transmitted between a selected ratio gear and an engaging clutch significantly decreases or falls to zero.

29. (Cancelled)

30. (Currently Amended) The transmission system of claim 28-29, wherein the first motor-generator is connected to the input and the second motor-generator is connected to the output.

31. (Currently Amended) The transmission system of claim 28-29, wherein the first and second motor-generators are electric motor-generators.

32. (Canceled)

33. (Currently Amended) The transmission system of claim 28-29, wherein the first motor-generator is a generator and the second motor-generator is a motor when driveline torque is positive.

34. (Currently Amended) The transmission system of claim 28-29, wherein the first motor-generator is a motor and the second motor-generator is a generator when driveline torque is negative.

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35. (Currently Amended) The transmission system of claim 28-29, wherein the power shunt includes electric power generated by one of the first and second motor-generators.

36. (Canceled)

37. (Currently Amended) The transmission system of claim 28-29, wherein the input is an input shaft and the output is an output shaft.

38. (Currently Amended) The transmission system of claim 28-29, wherein the power shunt includes an energy storage device.

39. (Original) The transmission system of claim 38, wherein the energy storage device stores electric power or fluid power.

40. (Canceled)

41. (Original) The transmission system of claim 28, wherein the ratio gears are engaged by a clutch and the power shunt is configured to route power applied to the transmission by one of the input and the output to the other one of the input and the output such that the rotational speed of a ratio gear is substantially similar to the rotational speed of an engaging clutch during a gear ratio change.

42. (Canceled)

43. (Canceled)

44. (Canceled)

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45. (Canceled)

46. (Canceled)

47. (Canceled)

48. (Canceled)

49. (Currently Amended) A powertrain system, comprising:
a change-gear transmission including an input, at least two gear ratios, and an output;
a prime mover connected to the input and configured to apply power to the transmission;
and
a motor-generator, wherein at least a portion of the motor generator is coupled to at least a portion of the output with no clutch operably interposed therebetween, and wherein the motor generator selectively absorbs or applies ~~connected to the output and adapted to absorb or apply~~
power to the output in conjunction with a corresponding increase or decrease, respectively, in the application of power by the prime mover to the transmission to facilitate a gear ratio change in the transmission.

50. (Original) The powertrain system of claim 49, wherein the powertrain system includes an energy storage device configured to store power received from the motor-generator when the motor-generator absorbs power from the output and further configured to provide power to the motor-generator when the motor-generator applies power to the output.

51. (New) The powertrain system of claim 50, wherein the stored power is stored electrochemically.

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52. (New) The powertrain system of claim 50, wherein the stored power is at least partially stored in a capacitor.

53. (New) The powertrain system of claim 49, wherein the gear ratio change is accomplished by engaging at least a portion of a clutch to at least a portion of a gear.

54. (New) A powertrain system, comprising:
a change-gear transmission including an input, at least two selectable gear ratios, and an output;
a prime mover for selectively applying power to the transmission; and
a power shunt, wherein the power shunt generates a rotational output from a power input, and the power shunt further generates a power output from a rotational input, and at least one of the power input and the power output are generated in a power transfer media that can be selectively stored.

55. (New) The system of claim 54, wherein the power shunt is at least partially defined by a flow of electric power.

56. (New) The system of claim 55, wherein the electric power may be stored in an energy storage device.

57. (New) The system of claim 54, wherein the power shunt includes a first motor-generator and a second motor-generator.

58. (New) The system of claim 54, wherein the power output is generated as electrical power.

59. (New) The powertrain system of claim 1, wherein the selection of a gear ratio is accomplished by engaging at least a portion of a clutch to at least a portion of a gear.

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60. (New) The powertrain system of claim 1, wherein the power shunt selectively shunts all power produced by the prime mover from the input to the output such that no power is transmitted through the gear ratios.

61. (New) The powertrain system of claim 1, wherein the power shunt selectively shunts no power produced by the prime mover from the input to the output, and about all power produced by the prime mover is selectively transmitted through the gear ratios.

62. (New) The powertrain system of claim 16, wherein all power produced by the prime mover selectively flows through the second power path while no power flows through the first power path.

63. (New) The powertrain system of claim 16, wherein the first motor generator generates an electrical current from the rotation of the input, at least a portion of the electrical current is routed to the second motor generator, and the second motor generator receives the at least a portion of the electrical current and causes rotation of the output.

64. (New) The transmission system of claim 28, wherein the selection of a gear ratio is accomplished by engaging at least a portion of a clutch to at least a portion of a gear.

65. (New) The transmission system of claim 28, wherein the power shunt selectively shunts all power produced by a prime mover from the input to the output such that no power is transmitted through the gear ratios.

66. (New) The transmission system of claim 28, wherein the power shunt selectively shunts no power produced by a prime mover from the input to the output, and about all power produced by the prime mover is transmitted through the gear ratios.